Arborist Report

Date: Sep 28, 2014

Client: Maher Welaye **Phone: 206-816-0455** **Email: maherwelaye@gmail.com**

Arborist: E. John Deutsch

Site: 7808 123 Ave NE, Kirkland, WA 98033

SUMMARY: An arborist assessment of the significant trees (minimum 6 inch DBH) located on the property is presented in this report. The trees have been evaluated in terms of viability: overall health and safety.

Attached is a tree inventory that presents specific information for each tree.

Total number of significant trees in inventory: 9

Number of viable significant trees on the property: 8

Tally (viable)**: = xxx viable trees 3, 5, 14, 2, 15, 1, 9, 1** **Total credits of the eight viable trees: 50**

Number of non-viable significant trees: 1 (#585)

Total tree credits of non-viable trees: 1 credit (#585)

Multi trunk dbh determined by square root formula, for all trunks over 2" dbh. For example,* if there are three trunks of 12, 13, and 17 inch DBH, the *square root of the sum of all squared stem DBHs. Formula: $12^2 + 14^2 + 17^2 = \sqrt{629} = 25.1$"

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TREE INVENTORY

A) #: Tree Number as stated in the tree inventory, the number tagged on each tree.

B) Species Tree: **C) DBH:** trunk diameter in inches at 4.5 ft from ground **D) Dripline,** radius of canopy (in feet)

E) Height of tree (in feet) **F) Lim Dist:** Limits of Disturbance: Distance recommended from trunk to protective fencing, in feet

G) LCR: Live Crown Ration in %, ratio of live crown to total height of tree **H) Crown Class:** Dominant, Co-dominant, Intermediate, Suppressed

I) Structure: Overall structure and form of tree, rated 1) Poor, 2) Satisfactory, 3) Good **J) Trunk:** Condition of trunk x/3

K) Health: Overall health and vigor of tree, rated 1) Poor, 2) Satisfactory, 3) Good

L) Viable: Viability for retention: Yes or No **M) Credits:** Tree Credits as per COK table

	#	Species	dbh	Dripline	Height	LimDist	LCR %	CrownC	Structure	Trunk	Health	Viable	Credits
.	582	Hemlock	14	10	45	8	85	CoDom	3	3	3	yes	3
.	583	Douglas Fir	19	18	70	10	80	Dom	3	3	3	yes	5
.	584	Maple	36	23	80	18	85	CoDom	2	2	3	yes	14

Comments (for tree above) CoDominant trunks. See photos

.	585	Cherry	11	15	25	6	65	CoDom	1	1	1	No	1

Comments (for tree above) Major dieback. Overmature, tree in decline

.	586	Thundercloud Plum	*12.8	16	35	7	80	Suppres	2	3	3	yes	2

Comments (for tree above) 3 trunks 9, 7, 6”

.	587	Douglas Fir	38	20	110	20	85	CoDom	3	3	3	yes	15
.	588	Japanese Maple	*7.3	8	15	4	70	CoDom	3	3	3	yes	1

Comments (for tree above) 3 trunks: 3, 3, 6”

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.	589	Douglas Fir	27	17	90	15	90	CoDom	3	3	3	yes	9
.	590	Japanese Maple	*9.5	9	20	5	80	CoDom	3	3	3	yes	1

Comments (for tree above) 6 trunks: 3, 3, 4, 4, 4, 5”

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Appendix 1: Protective Fencing

Protective fencing must be installed for all significant trees that are going to be retained which are in close proximity of building construction. Protective fencing is also required for any significant trees that are close to construction related vehicle traffic (excavators, supply trucks etc) Protective fencing is not required for non-significant trees. **Protective fencing distances are indicated in Limits of Disturbance. They indicate the minimum distance of the protective fencing from the trunk of each tree.**

Note: The completed site plan (provided by the surveyor) should include a COK fencing detail, tree fence locations, tree #'s (corresponding with the arborist's report), and tree drip-lines.

Appendix 2: Methods to determine limits of disturbance in this report:

In this report, limits of disturbance was done by a modification of the ISA Critical Root Zone Protection.

> **Critical Root Zone Protection:** A critical step in retaining healthy trees during construction and development is the protection of tree roots from disturbance. Each tree has a critical root zone (CRZ) that varies by species and site conditions. The International Society of Arboriculture (ISA) defines CRZ as an area equal to 1-foot radius from the base of the tree's trunk for each 1 inch of the tree's [DBH] diameter at 4.5 feet above grade (referred to as diameter at breast height).[1]

In an ideal situation, we adhere to the above recommendations of 1 foot for every one inch of DBH. However, on small urban lots with new construction activity, these distances are extremely impractical. With a conifer of 36" DBH, this would require that protective fencing be located at a distance of 36 ft from the trunk; the recommended protective zone would be 75 ft by 75 ft This would require that an area of approximately 5,625 sq ft be fenced off in order to protect the critical root zone. A common size for a urban lot is only 7,200 sq ft. Therefore, if the above ISA guidelines are used, in many situations, the lot is virtually "unbuildable," unable to be developed.

For this reason, on smaller urban lots, I generally recommend that the above guidelines be reduced by one-half (one foot for every TWO inches of trunk diameter) In the above example of 36" DBH, I would suggest that the protective fencing be placed 18 ft from the trunk. My making such a major reduction (39 ft by 39 ft = 1521 sq ft) in the area of the CRZ, clearly there is a significantly greater chance that the tree may decline due to root zone disturbance. However, the only alternative would be removal of the tree(s) when building on small urban lots. It is a calculated risk, and, I believe, an acceptable level of risk. Even with such a major reduction of CRZ area, the presence of larger diameter trees will still be frequently problematic.

[1] Tree Protection on Construction and Development Sites (2009) A Best Management Practices Guidebook for the Pacific Northwest

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Appendix 3 from Tree Protection on Construction and Development Sites (2009) By Oregon State University, Extension Service, 2009
Source: http://www.dnr.wa.gov/Publications/rp_urban_treeprtctnguidbk.pdf

Page 3: Critical Root Zone Protection
A critical step in retaining healthy trees during construction and development is the protection of tree roots from disturbance. Each tree has a critical root zone (CRZ) that varies by species and site conditions. **The International Society of Arboriculture (ISA) defines CRZ as an area equal to 1-foot radius from the base of the tree's trunk for each 1 inch of the tree's diameter at 4.5 feet above grade (referred to as diameter at breast height).**

Tree diameter	Critical root zone radius	Total protection zone diameter, including trunk
2 inches	2 feet	4+ feet
6 inches	6 feet	13.5 feet
20 inches	20 feet	42 feet
46 inches	46 feet	96 feet

Page 4: Another common rule of thumb is to use a tree's dripline to estimate the CRZ . We recommend you evaluate both of these and choose whichever provides the larger CRZ. Under certain circumstances, disturbing or cutting roots in a CRZ may be unavoidable. In such cases, the work should be done only under the onsite supervision of an ISA certified arborist. Cutting or disturbing a large percentage of a tree's roots increases the likelihood of the tree's failure or death. Most tree roots over 4 inches in diameter are likely to be structural roots; cutting these roots may impact the structural stability of the tree, creating the potential for catastrophic failure (the tree may fall over).
The BMPs listed below retain good air and water supply to the critical roots of protected trees, as well as protect them from mechanical damage, to help trees remain as healthy and stable as possible during the construction process and beyond:

1. Establish a CRZ for both large and small trees.
2. Install strong fencing around the CRZ and require the fence to remain in place for the life of the development project to ensure protection.
3. Post appropriate signage to help convey the importance of the CRZ to workers.
4. Avoid cutting tree roots over 4 inches in diameter.
5. Make all necessary cuts to tree roots cleanly with sharp tools; never tear with a backhoe. A clean cut encourages good wound closure and confines the spread of decay.

To protect trees and tree roots within the fenced CRZ, do not do the following:

1. Stockpile construction materials or demolition debris.
2. Park vehicle or equipment.
3. Pile soil and/or mulch.
4. Trench for utilities installation or repair, or for irrigation system installation.
5. Change soil grade by cutting or filling.
6. Damage roots by grading, tearing, or grubbing.

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7. Compact soil with equipment, vehicles, material storage, and/or foot traffic.
8. Contaminate soil from washing out equipment (especially concrete) and vehicle maintenance.
9. Install impervious parking lots, driveways, and walkways.
10. Attach anything to trees using nails, screws, and/or spikes.
11. Wound or break tree trunks or branches through contact with vehicles and heavy equipment.
12. Wound trunks with string weed trimmers and lawn mowers.
13. Cause injury by fire or excessive heat.

Page 5 Some tree species are more tolerant of damage and disturbance in the CRZ than others. A tree's tolerance depends not only upon the species but also upon conditions present prior to and at the time of the damage. Tree health, age of the tree, soil aeration and moisture, the time of year the damage occurs, its severity, and the weather conditions prior to, during, and after the damage all contribute to the tree's response. An experienced ISA certified arborist can analyze these variables and make specific recommendations to retain or recover a tree's health and safety during and after the construction process.

BMPs for Tree Protection Planning

1. Plan and budget for tree conservation and protection as part of the development process.
2. Plan for tree protection at least one growing season prior to the beginning of construction activities, where possible.
3. Employ an ISA certified arborist or an urban forester whenever possible to assist in tree protection planning, implementation, monitoring, and follow-up maintenance.
4. Plan to protect trees located on adjacent property, including those portions of the roots, trunk, and crown growing into or over the developing property.
5. Evaluate soil health and past site damage; incorporate that information into tree protection measures.
6. Evaluate existing trees on the site. Locate buildings, other structures and infrastructure through evaluation of the opportunities and constraints of existing trees. Select trees to be conserved and protected based upon their location, species, quality, health, and benefits such as energy savings by shade or wind protection.
7. Remove trees within 10 feet of the proposed building or structure.
8. Remove trees that cannot be adequately protected.
9. Remove trees that have less than one-quarter of their total height composed of tree crown (tall and spindly), or those with more than one-third of the trunk wounded.
10. Do not remove the best trees.
11. Conserve and protect trees in stands or groups where possible to facilitate their protection and maintenance, and to keep the forest structure intact.
12. Establish substantial penalties for tree damage and noncompliance with tree protection requirements.
13. Complete preconstruction tree maintenance, including mulch, fertilization, supplemental irrigation as necessary, and pruning to remove dead, structurally weak, and low-hanging branches.
14. Engage maintenance staff in early decision-making and education about care of retained trees.

Page 6 Implementation & Monitoring during Construction

1. Educate all workers on site about tree protection techniques and requirements during preconstruction meetings and by sharing this guidebook with them.
2. Establish a TPZ based on a tree's CRZ (discussed above).
3. Establish TPZs early, during site planning prior to construction.
4. Erect barriers or sturdy fencing around individual trees or groups of trees to define and protect CRZs (see figure).
5. Protect high-value trees with stem, branch, and root padding or wraps in addition to CRZ barriers.

6. Clearly identify the perimeter of TPZs with highly visible signs.
7. Establish one access route into the site and one exit route out of the site.
8. Confine construction offices, vehicular parking, worker break sites, and material storage to locations outside TPZs.
9. Avoid trenching through the CRZ of protected trees. Alter routes of underground infrastructure or use alternate methods such as pipe boring.
10. Do not trench or excavate the soil within CRZs. Tunnel or bore at least 18 inches beneath CRZs to install utility lines.
11. Where tree roots must be cut, make only sharp, clean cuts to promote root callusing and regeneration.
12. Remove badly damaged trees that may attract insects and disease.
13. Evaluate the potential of dead, damaged, or dying trees for wildlife habitat either as standing dead or woody debris if left onsite.
14. Monitor tree health and compliance with tree protection requirements regularly during construction.

Page 7 Protect individual trees Follow-up Maintenance

1. Complete post-construction tree maintenance, including mulch, fertilization, irrigation, soil aeration, and pruning where necessary.
2. In the absence of adequate rainfall, apply at least 1 inch of water per week by deep soaking methods.
3. Fertilize trees with phosphorus, potassium, calcium, magnesium, and other macro- and micro-nutrients as indicated by a soil test, but wait at least 1 year to apply any nitrogen.
4. Fertilize lightly with nitrogen after 1 year. If recommended by an arborist, light annual applications of nitrogen may be made for the next 3 to 5 years.
5. Inspect trees annually for at least 3 to 5 years after construction to look for changes in condition and signs of insects or disease, and to determine maintenance needs.
6. Remove trees that are badly damaged or are in irreversible decline if unsuitable for wildlife habitat.
7. Continue to protect not only the large, established trees on the site but also those newly planted in the landscape.
8. Mulch trees on a regular schedule, ensuring that mulch does not rest against tree trunk.
9. Develop a regular maintenance program that incorporates fertilization BMPs and integrated pest management techniques to get best results at lowest cost.

Page 14 PLANTING & ESTABLISHING NEW TREES Proper Tree Planting

Proper tree planting is essential to long-term tree survival, health, and safety. Planting trees seems like a simple task, but if a tree is to thrive and not just survive, it is best to begin with the development of a planting plan designed to meet the objectives of the property owner or the requirements of local development regulations. The establishment process begins with the selection of good planting sites and appropriate tree species and varieties. Sites are prepared, trees are purchased and planted, and regular maintenance is scheduled for at least 3 years or until trees are established and growing well on their own.

A plan and schedule to plant new trees on a regular basis is useful to replace trees that are removed, to add to an existing group of trees, and to ensure that the community's urban forest remains diverse, dynamic, and stable.

Benefits of a planned planting program and protocol are as follows:

1. stable tree population with a diversity of ages, sizes, and species
2. tree canopy cover maintenance and development for future generations
3. opportunities for community involvement in tree planting and maintenance activities
4. better survival of young trees and lower tree establishment costs
5. Common mistakes made in tree planting and establishment include the following:
6. inadequate growing space (the tree grows too large for the available space)

7. inadequate soil volume, restricting root growth and potentially decreasing tree stability
8. selected species or variety not appropriate for the site conditions (available growing space, soil moisture and pH, sunlight, temperature, or general climate)
9. poor quality planting stock
10. tree planted in a hole that is too small
11. inappropriate soil amendments or mixtures added to the transplanting hole
12. roots of transplant stock not protected from heat and wind damage during transportation and pre-planting storage
13. tree planted too deep (root collar must be above soil level)
14. regular after-planting care, especially supplemental water, not provided during the 3-year establishment period
15. trees staked unnecessarily and/or incorrectly
16. stakes and guy wires are left on the tree too long

BMPs for Tree Establishment Tree Selection

1. Select a tree of appropriate mature size for the site.
2. Select native tree species for planting when appropriate for the location and if good quality stock is available.

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Use nonnative species and varieties if necessary where native soils may be severely impacted by long-term development, such as those found in many urban locations, and cannot support healthy native tree species. Choose noninvasive species and varieties appropriate to the development soils.

1. Select trees compatible with special site conditions, such as extremely wet (poor draining) or dry (excessive draining) soils.
2. Select only good quality planting stock.
3. Select nursery stock that meets the minimum standards for root ball size and quality as defined in ANSI A300 (Standards for Nursery Stock).
4. Protect trees from wind damage during transport by wrapping the whole tree including roots with a tarp or landscape fabric.
5. Protect the root ball of transplant stock with mulch or other protective measures during storage and planting activities.
6. Plan for a diversity of tree species and varieties to protect the urban forest from massive failure due to pest or disease infestation and to add visual interest.

Site Selection

1. Plant trees where they have plenty of room to grow to maturity without compromised health or form due to conflicts with adjacent infrastructure.
2. Provide trees with an adequate amount of soil volume for tree growth and stability. Adequate volumes range from 400 to 1,000 cubic feet depending on the mature canopy spread. To find the width and length of soil needed, assume a depth of 3 feet. A good rule of thumb is to assume 1.5 cubic feet of soil volume for each square foot of mature canopy.
3. Make sure there is now and will be at tree maturity adequate clearance from overhead utility lines, pedestrian and vehicular traffic, buildings, signs, and street lights. Local jurisdictions may have preferred guidelines for such setbacks.
4. Consult with local utilities for planting specifications to maintain adequate utility clearance.
5. Plant the right tree in the right place (for example, don't plant large trees that require constant pruning to maintain safety under overhead power lines).

Tree Assessment,
Photo file to accompany written report.
Site: 7808 123 Ave NE, Kirkland WA 98033
Date: Sep 28, 2014

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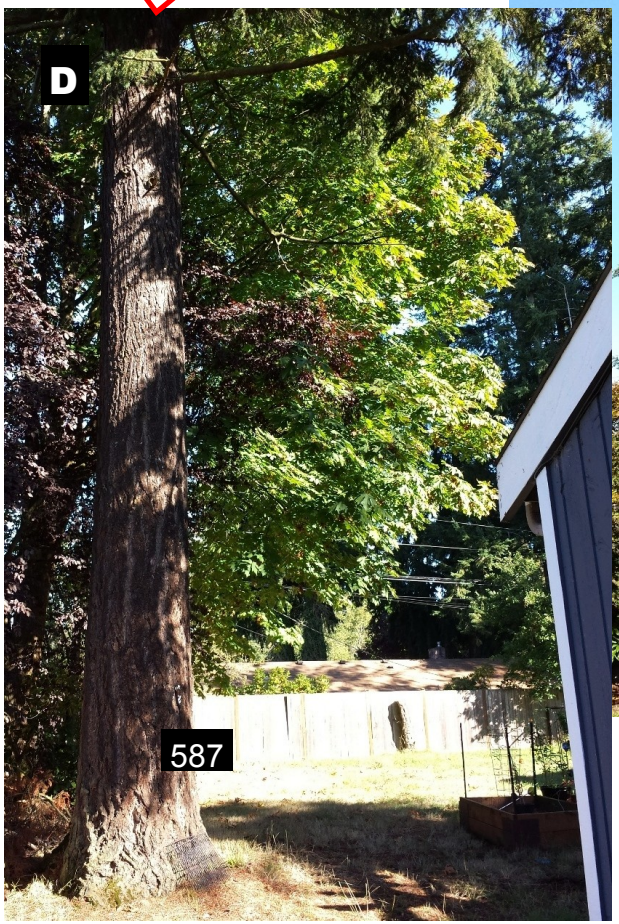
Bare trunk of very large D Fir trunk. Higher hazard rating for existing house and future improvements

Major dieback throughout canopy



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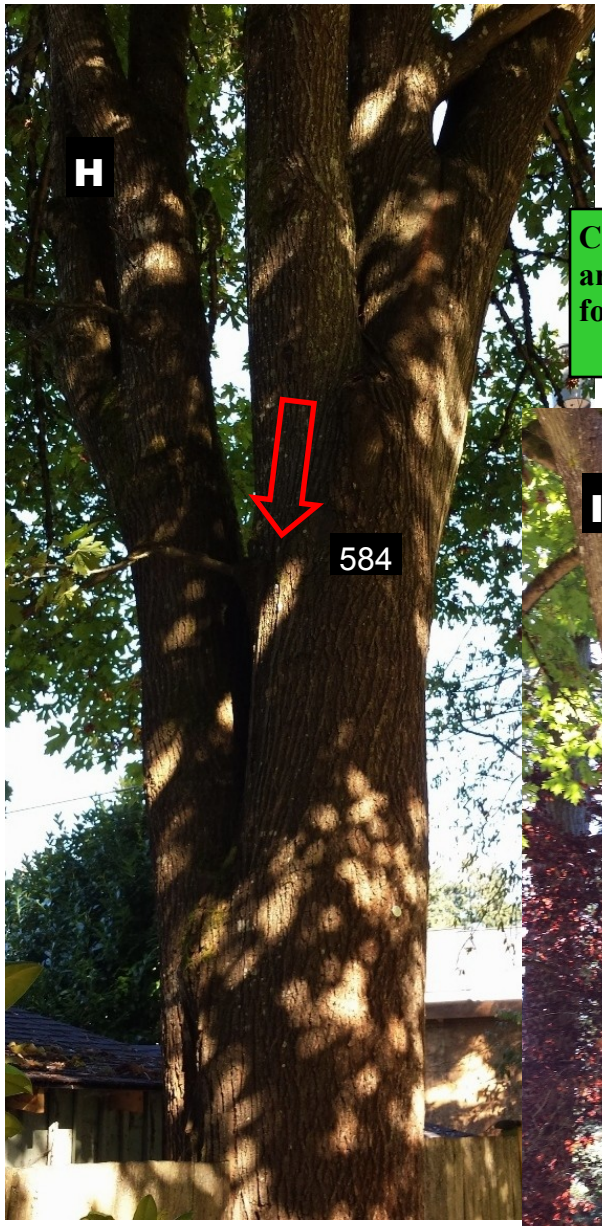

Codominant trunks: higher hazard rating, likely to separate at fork due to included bark.

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